

General Description

The GreenMOS[®] high voltage MOSFET utilizes charge balance technology to achieve outstanding low on-resistance and lower gate charge. It is engineered to minimize conduction loss, provide superior switching performance and robust avalanche capability.

The GreenMOS[®] Z series is integrated with fast recovery diode (FRD) to minimize reverse recovery time. It is suitable for resonant switching topologies to reach higher efficiency, higher reliability and smaller form factor.

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity

GreenMOS[®]



Applications

- PC power
- LED lighting
- Telecom power
- Server power
- EV Charger
- Solar/UPS

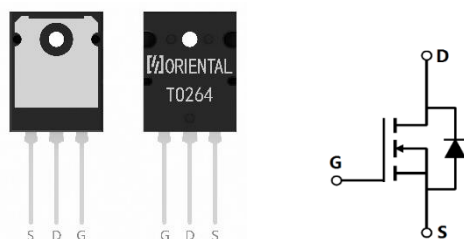
Key Performance Parameters

Parameter	Value	Unit
$V_{DS, \min} @ T_{j(max)}$	800	V
I_D, pulse	159	A
$R_{DS(ON)}, \max @ V_{GS}=10V$	69	m Ω
Q_g	147	nC

Marking Information

Product Name	Package	Marking
OSG80R069RZF	TO264	OSG80R069RZ

Package & Pin Information



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	800	V
Gate-source voltage	V_{GS}	± 30	V
Continuous drain current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_D	53	A
Continuous drain current ¹⁾ , $T_C=100^{\circ}\text{C}$		33.5	
Pulsed drain current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{D, \text{pulse}}$	159	A
Continuous diode forward current ¹⁾ , $T_C=25^{\circ}\text{C}$	I_S	53	A
Diode pulsed current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{S, \text{pulse}}$	159	A
Power dissipation ³⁾ , $T_C=25^{\circ}\text{C}$	P_D	500	W
Single pulsed avalanche energy ⁴⁾	E_{AS}	1960	mJ
MOSFET dv/dt ruggedness, $V_{DS}=0\ldots 480\text{ V}$	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS}=0\ldots 480\text{ V}$, $I_{SD}\leq I_D$	dv/dt	50	V/ns
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	0.25	$^{\circ}\text{C/W}$
Thermal resistance, junction-ambient	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	800			V	$V_{GS}=0\text{ V}$, $I_D=2\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	3.0		4.5	V	$V_{DS}=V_{GS}$, $I_D=2\text{ mA}$
Drain-source on-state resistance	$R_{DS(ON)}$		0.048	0.069	Ω	$V_{GS}=10\text{ V}$, $I_D=26\text{ A}$
			0.13			$V_{GS}=10\text{ V}$, $I_D=26\text{ A}$, $T_j=150^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=30\text{ V}$
				-100		$V_{GS}=-30\text{ V}$
Drain-source leakage current	I_{DSS}			10	μA	$V_{DS}=800\text{ V}$, $V_{GS}=0\text{ V}$
Gate resistance	R_G		2.2		Ω	f= 1 MHz, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		9339		pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oss}		369		pF	
Reverse transfer capacitance	C_{rss}		7.9		pF	
Turn-on delay time	$t_{d(on)}$		57		ns	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, $R_G=2\ \Omega$, $I_D=20\text{ A}$
Rise time	t_r		43.5		ns	
Turn-off delay time	$t_{d(off)}$		116		ns	
Fall time	t_f		5.4		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		147		nC	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, $I_D=20\text{ A}$
Gate-source charge	Q_{gs}		54.5		nC	
Gate-drain charge	Q_{gd}		35.1		nC	
Gate plateau voltage	$V_{plateau}$		6.2		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	$I_S=20\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		180		ns	$V_R=400\text{ V}$, $I_S=20\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		1.4		μC	
Peak reverse recovery current	I_{rrm}		14.2		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=100\text{ V}$, $V_{GS}=10\text{ V}$, $L=80\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

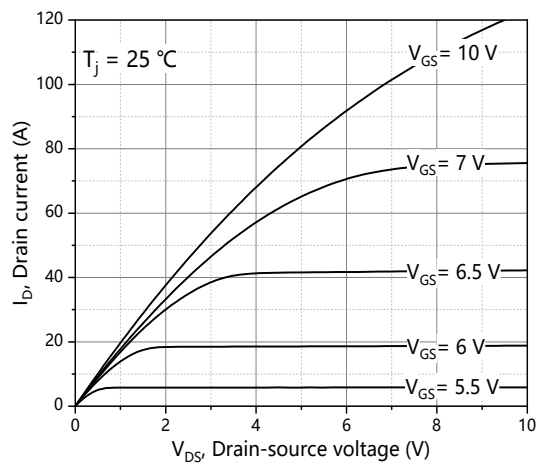


Figure 1. Typ. output characteristics

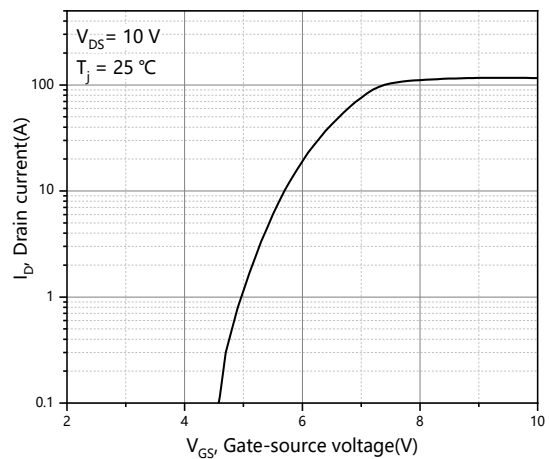


Figure 2. Typ. transfer characteristics

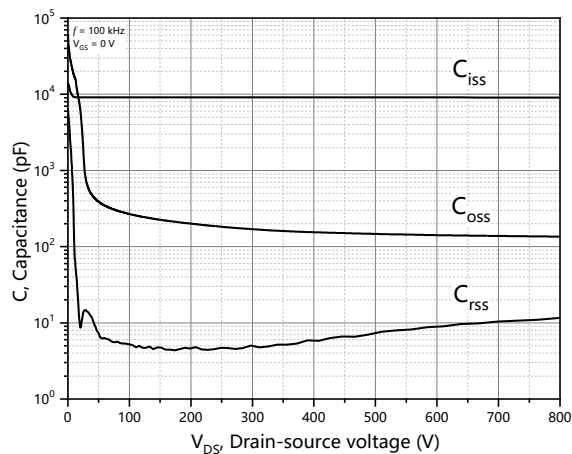


Figure 3. Typ. capacitances

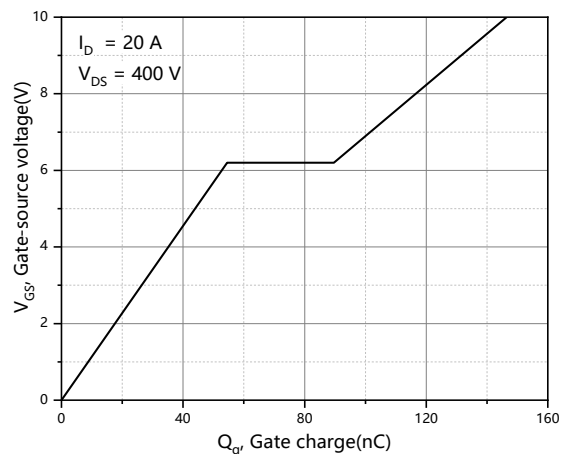


Figure 4. Typ. gate charge

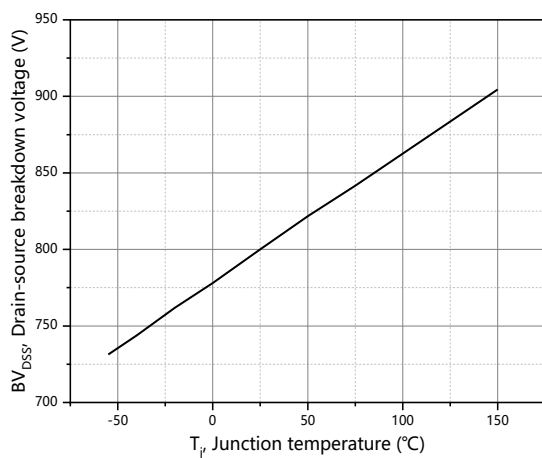


Figure 5. Drain-source breakdown voltage

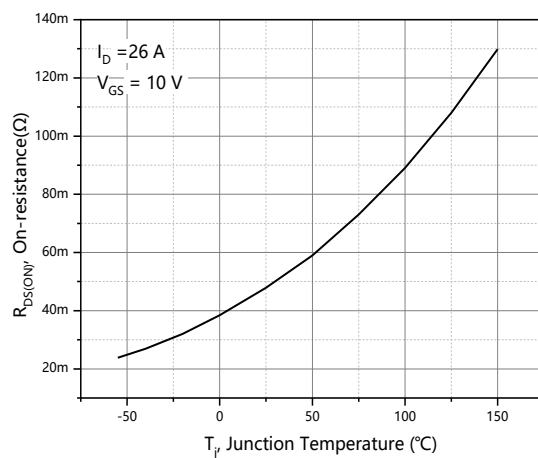


Figure 6. Drain-source on-state resistance

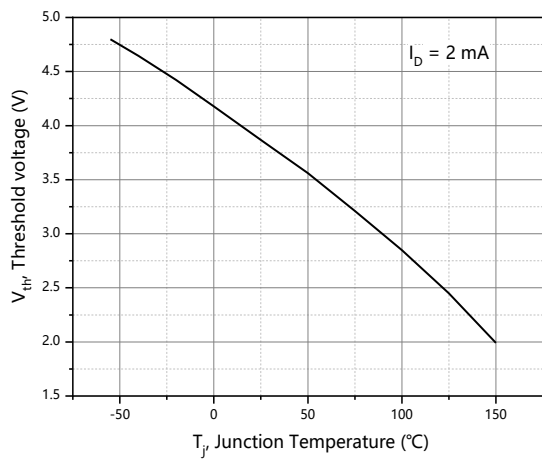


Figure 7. Threshold voltage

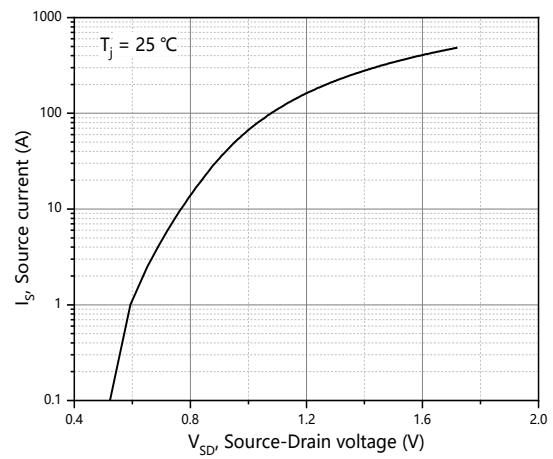


Figure 8. Forward characteristic of body diode

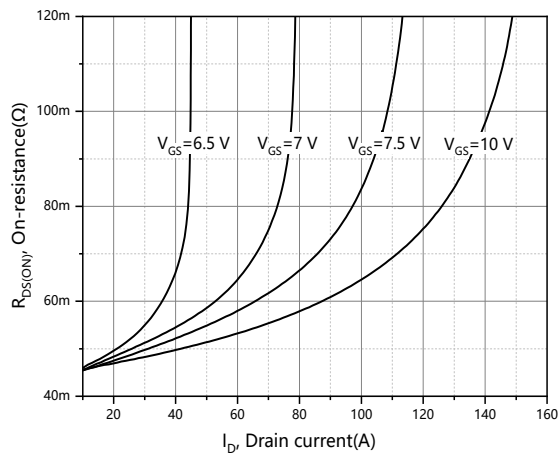


Figure 9. Drain-source on-state resistance

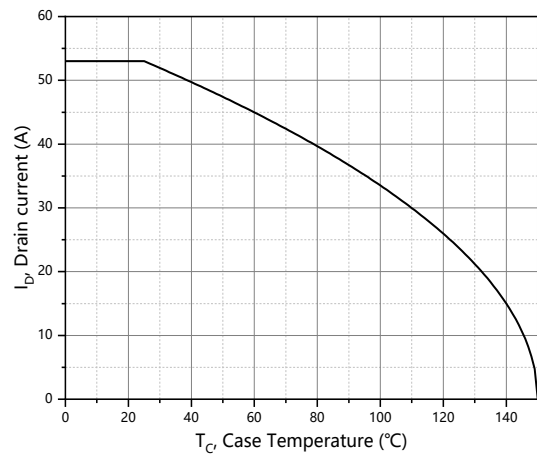


Figure 10. Drain current

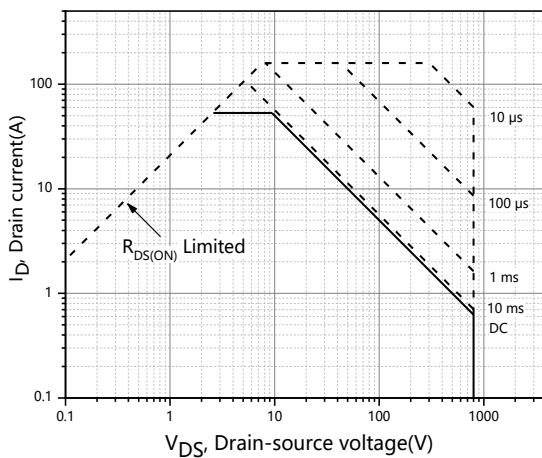


Figure 11. Safe operation area $T_C=25$ °C

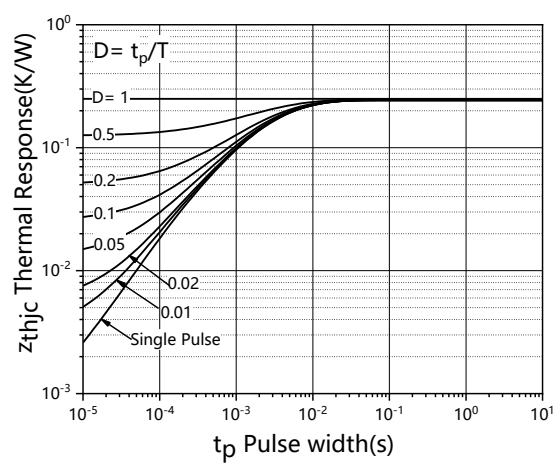


Figure 12. Max. transient thermal impedance

Test circuits and waveforms

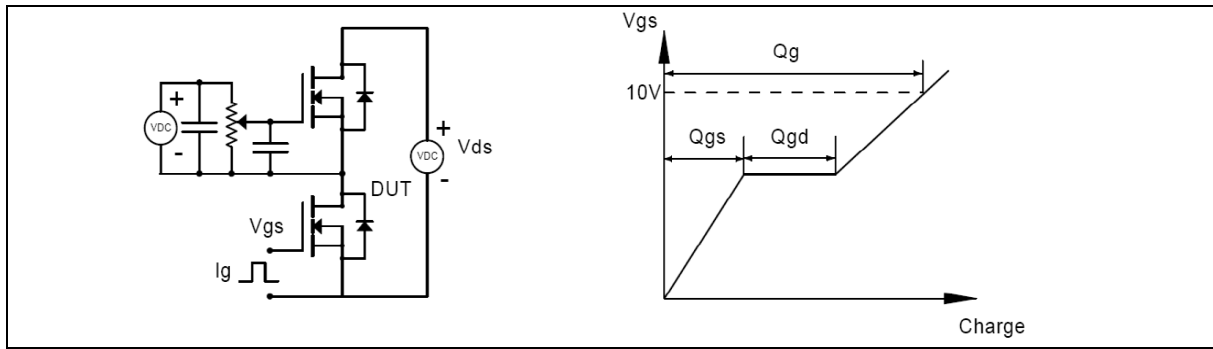


Figure 1. Gate charge test circuit & waveform

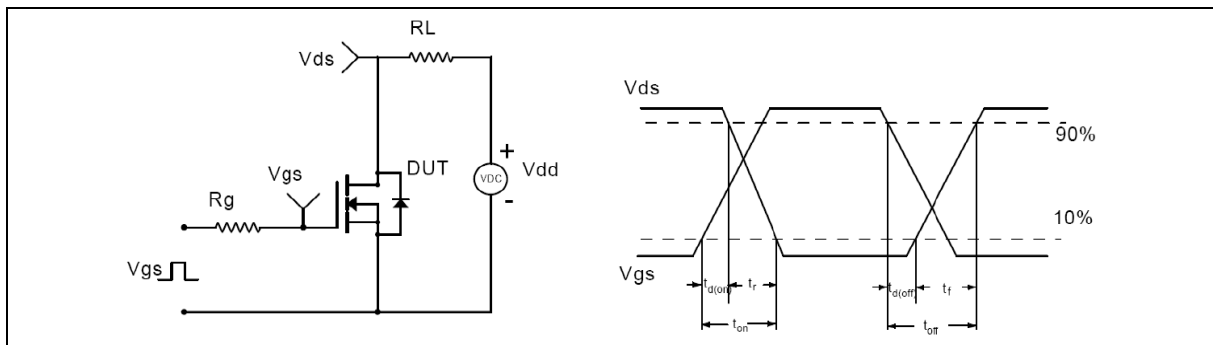


Figure 2. Switching time test circuit & waveforms

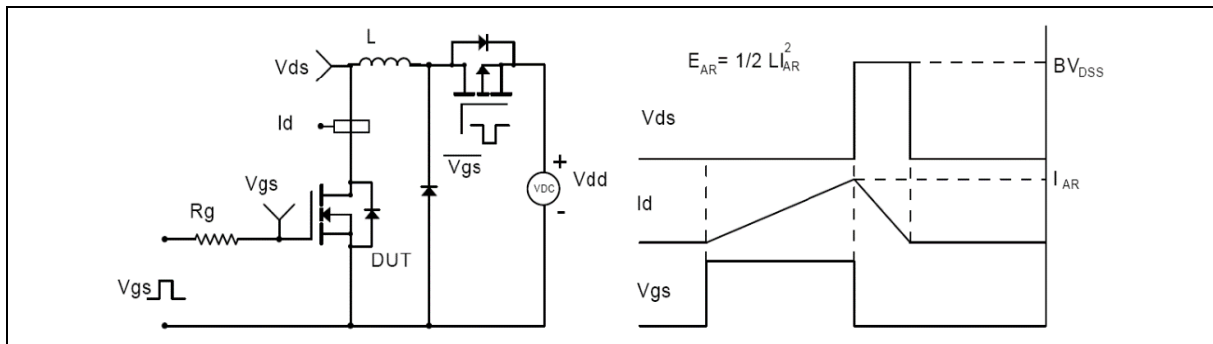


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

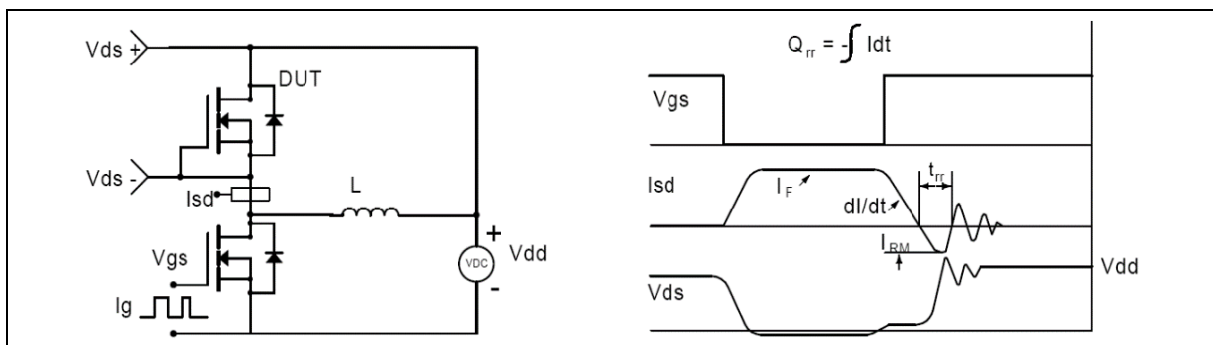
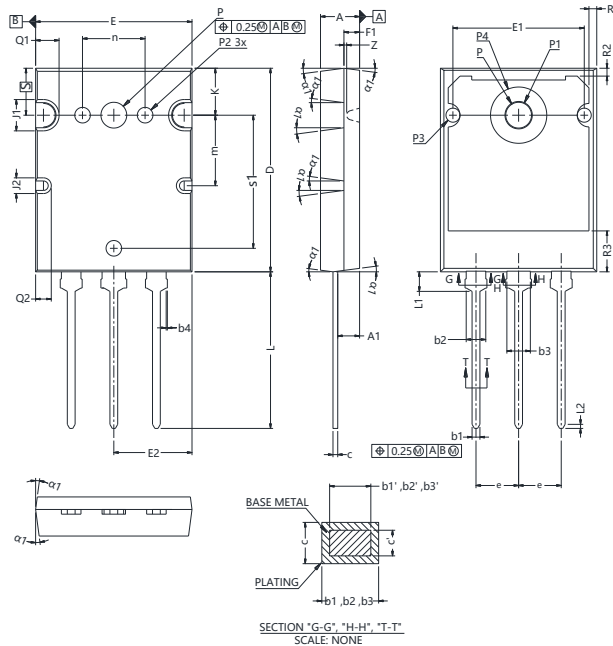


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		Symbol	mm	
	Min	Max		Min	Max
A	4.90	5.10	L	19.80	20.50
A1	2.60	3.00	L1	2.40	2.59
b1	0.94	1.15	L2	0.50REF	
b1'	0.94	1.13	m	9.00REF	
b2	2.35	2.65	n	8.00REF	
b2'	2.35	2.63	p	3.20	3.40
b3	2.85	3.15	P1	3.50REF	
b3'	2.85	3.13	P2	2.00REF	
b4	-	0.20	P3	1.80REF	
c	0.55	0.75	P4	7.20REF	
c'	0.55	0.73	Q1	3.00REF	
D	25.80	26.20	Q2	2.00REF	
E	19.80	20.20	R1	0.95	1.05
E1	16.80REF		R2	0.90	1.10
E2	10.00REF		R3	5.23REF	
e	5.35	5.55	S	6.00BSC	
F1	2.00REF		s1	17.00REF	
J1	4.00REF		α1	7.5°REF	
J2	2.00REF		Z	0.25	0.45
k	6.00REF				

Version 1: TO264-S package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO264-S	25	20	500	2	1000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG80R069RZF	TO264	yes	yes	yes

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